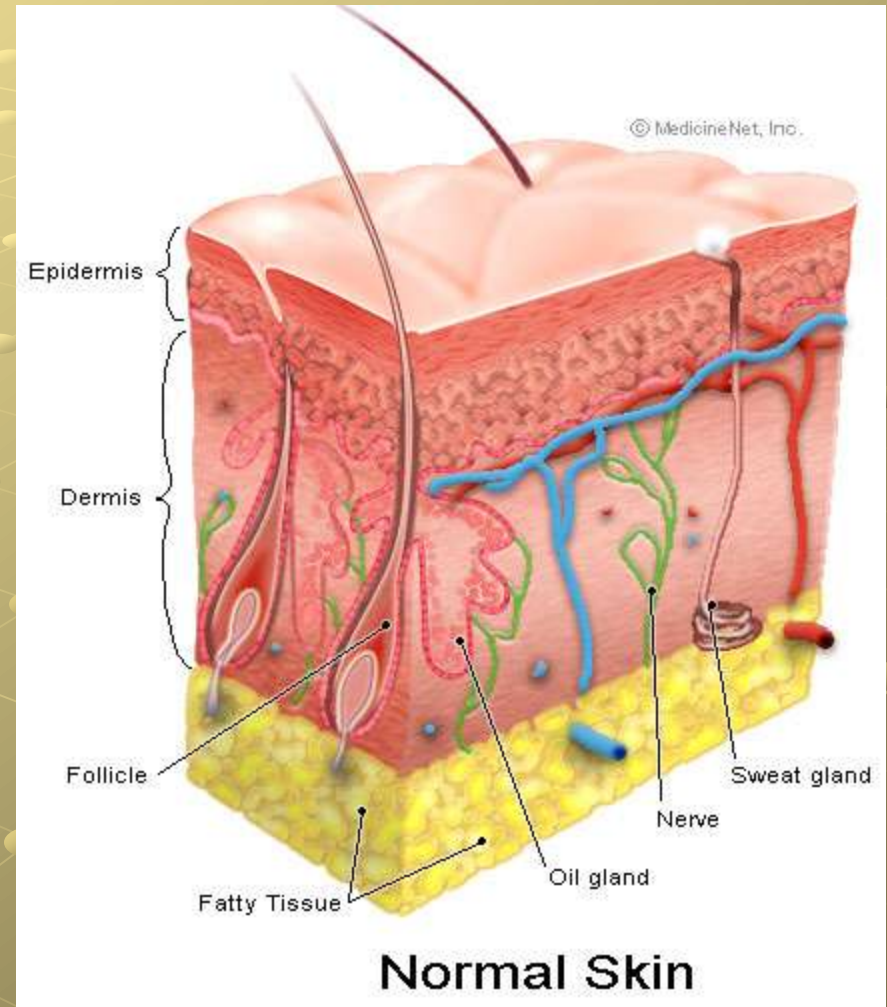


The Integumentary System

Our Body's **BIO** Armor

The Integumentary System

- The integumentary system consists of skin (the body's largest organ) and many epidermal derivatives; which include hair follicles, sebaceous glands (produce the oils in our skin), sweat glands, and nails.



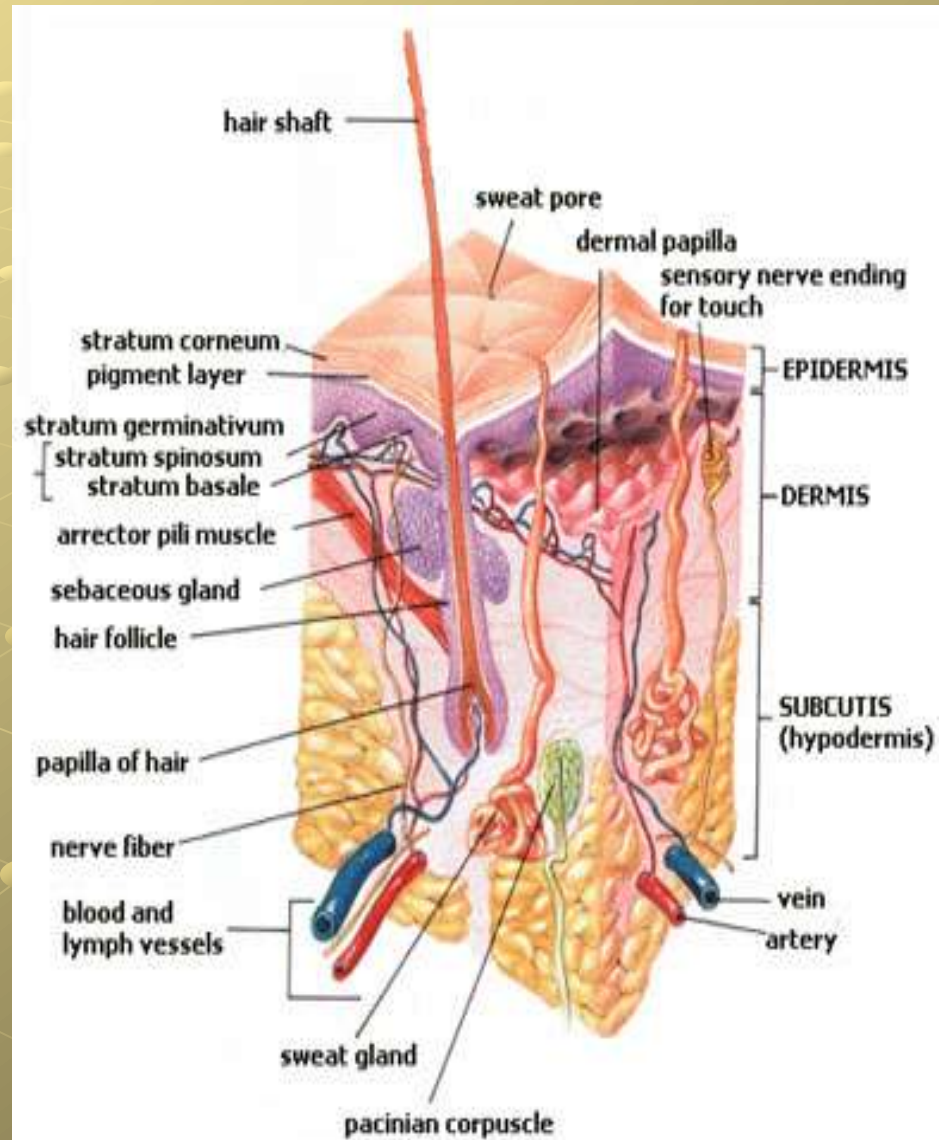
The Integumentary System

- This system is made up of numerous tissues including but not limited to stratified squamous epithelium, glandular epithelium, smooth muscle, adipose tissue and nervous tissue.
- Each of these tissues as we have already discussed perform specific tasks which give the skin its chief function.

The Integumentary System

- The **skin** or cutaneous membrane is made up of two distinct regions or layers.

1.) The **epidermis** is the outer most layer which is made up of keratinized stratified squamous ET.

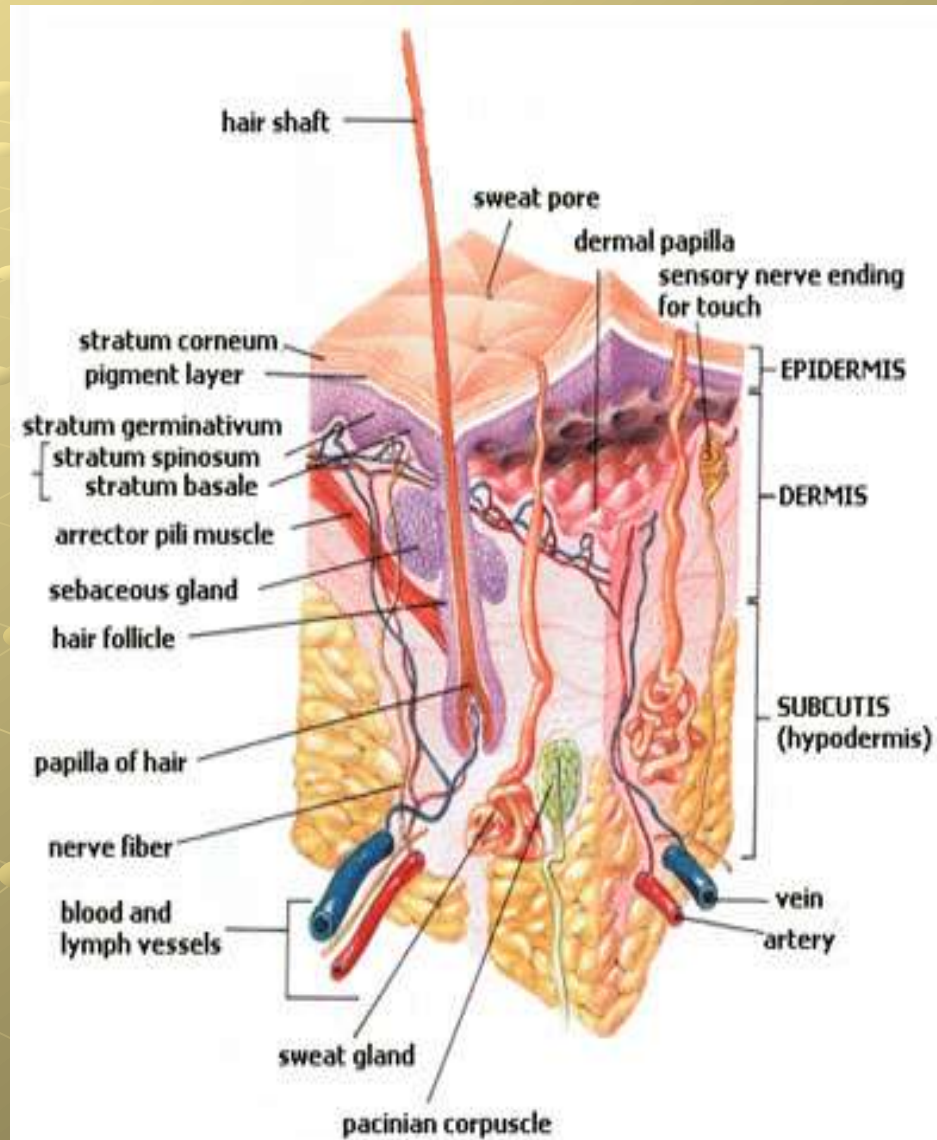


The Integumentary System

2.) The ***dermis*** is the inner layer which is made up of:

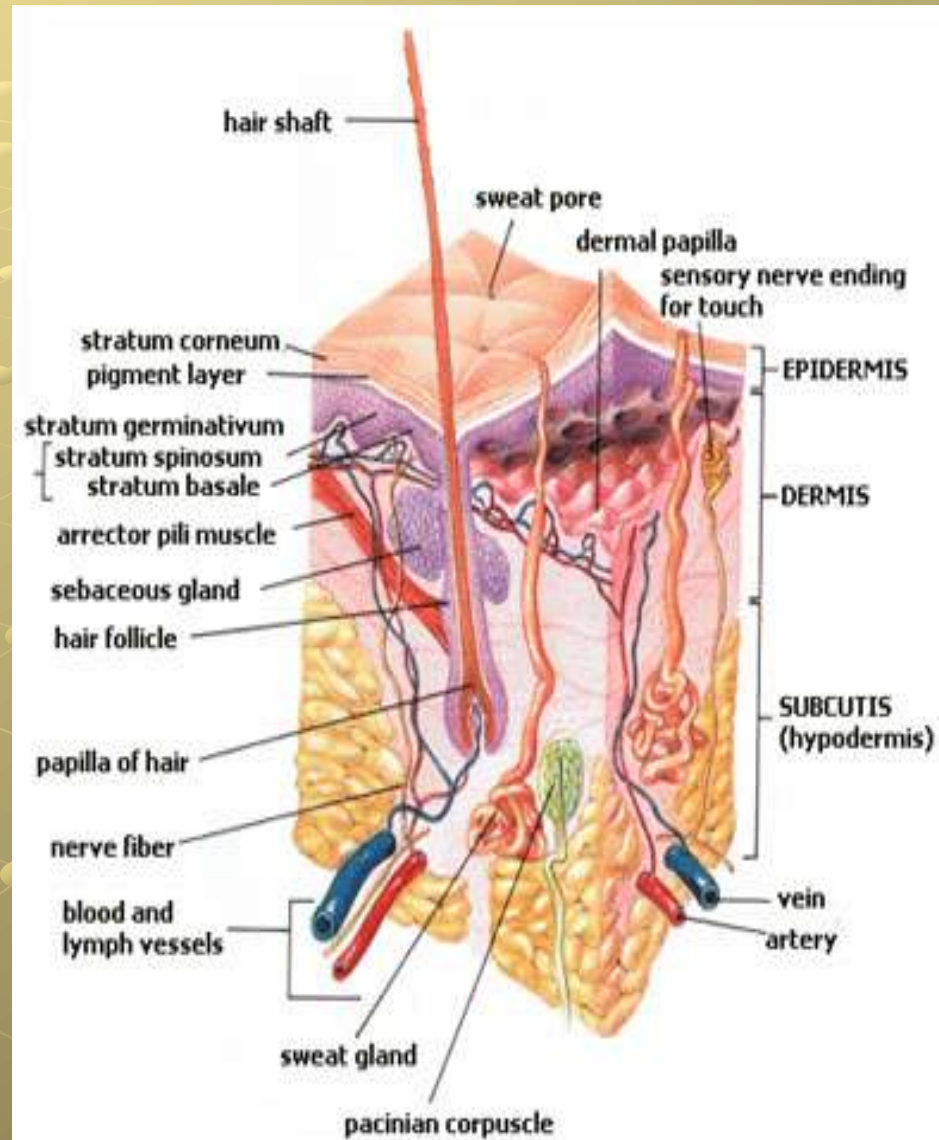
- Keratinized epithelium making up hair follicles
- Glandular epithelium making up sebaceous and sweat glands
- Dense irregular CT making up collagen

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NEXT SLIDE**



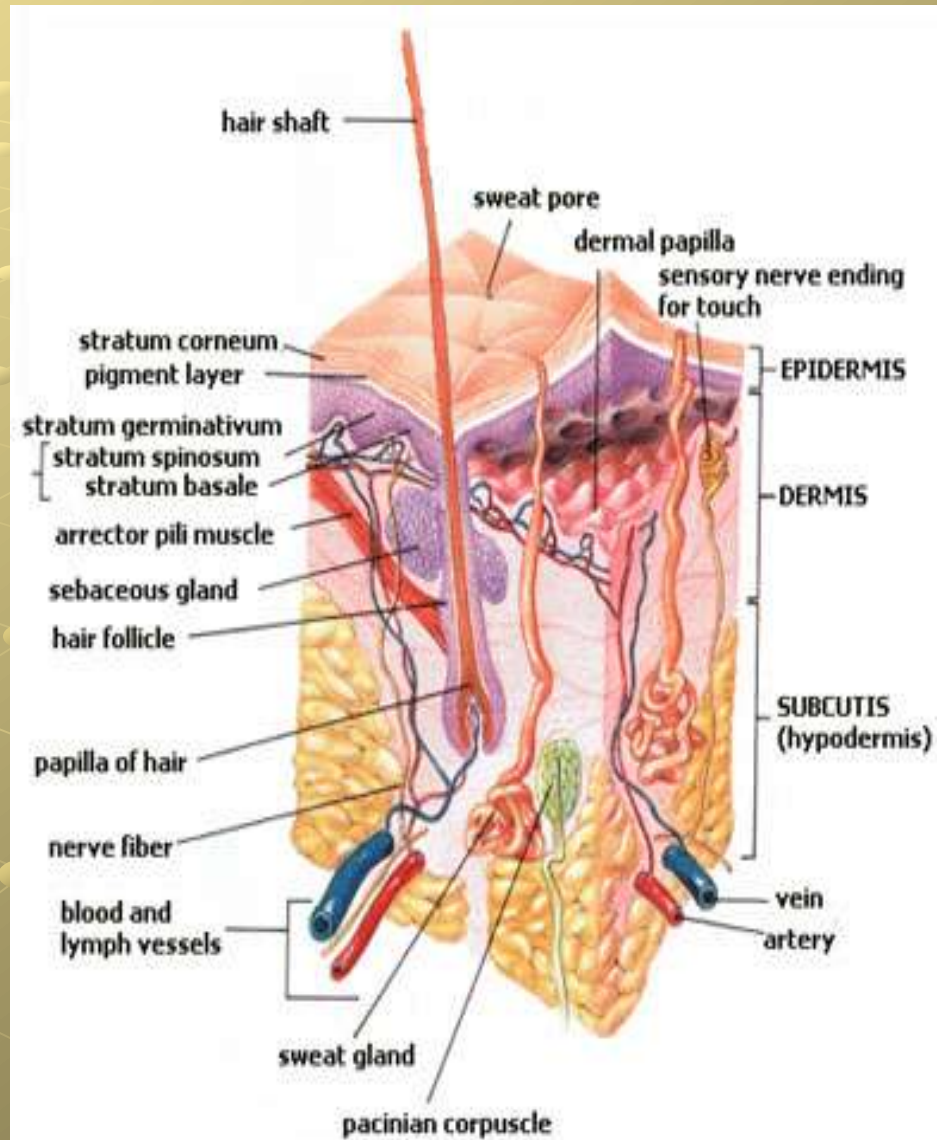
The Integumentary System

- Smooth muscle tissue making up arrector pili muscles (which cause your hairs to stand on end)
- Nervous tissue making up Meissner's & Pacinian Corpuscles (which are the nerve endings that give you touch response to stimuli)
- Blood vessels



The Integumentary System

- The ***subcutaneous layer*** is the layer beneath the skin that makes up adipose tissue



The Integumentary System

- The layers of the skin all have distinct functions.
 - The epidermis is responsible for protecting the body.
 - The dermis is responsible for nourishing the epidermis.
 - The subcutaneous layer is responsible for insulating the body.

The Integumentary System

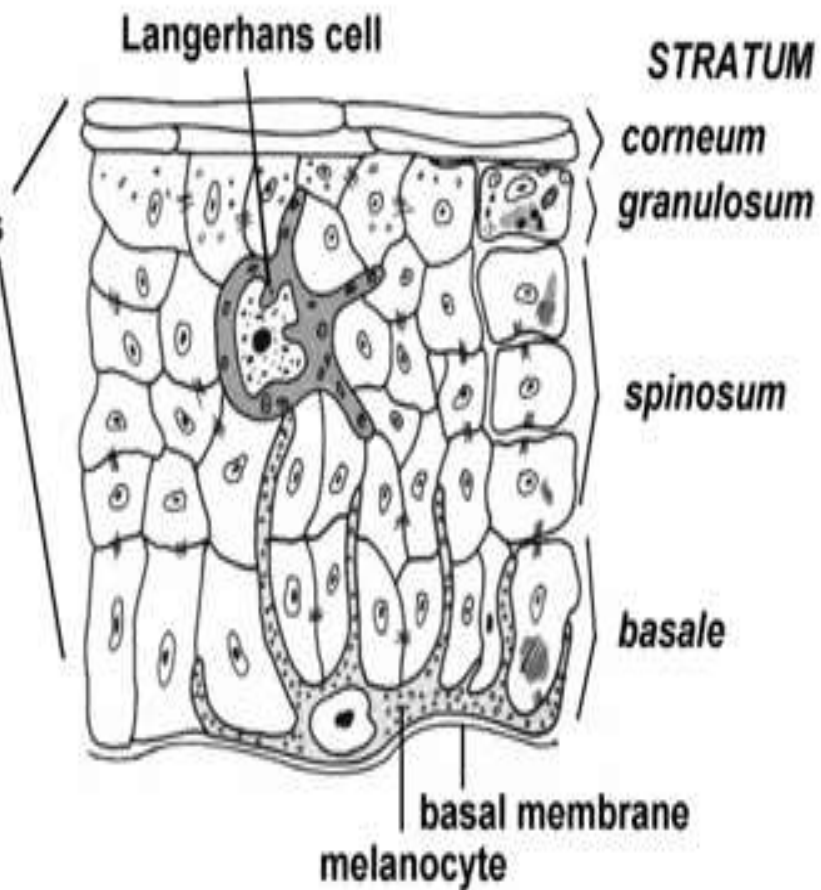
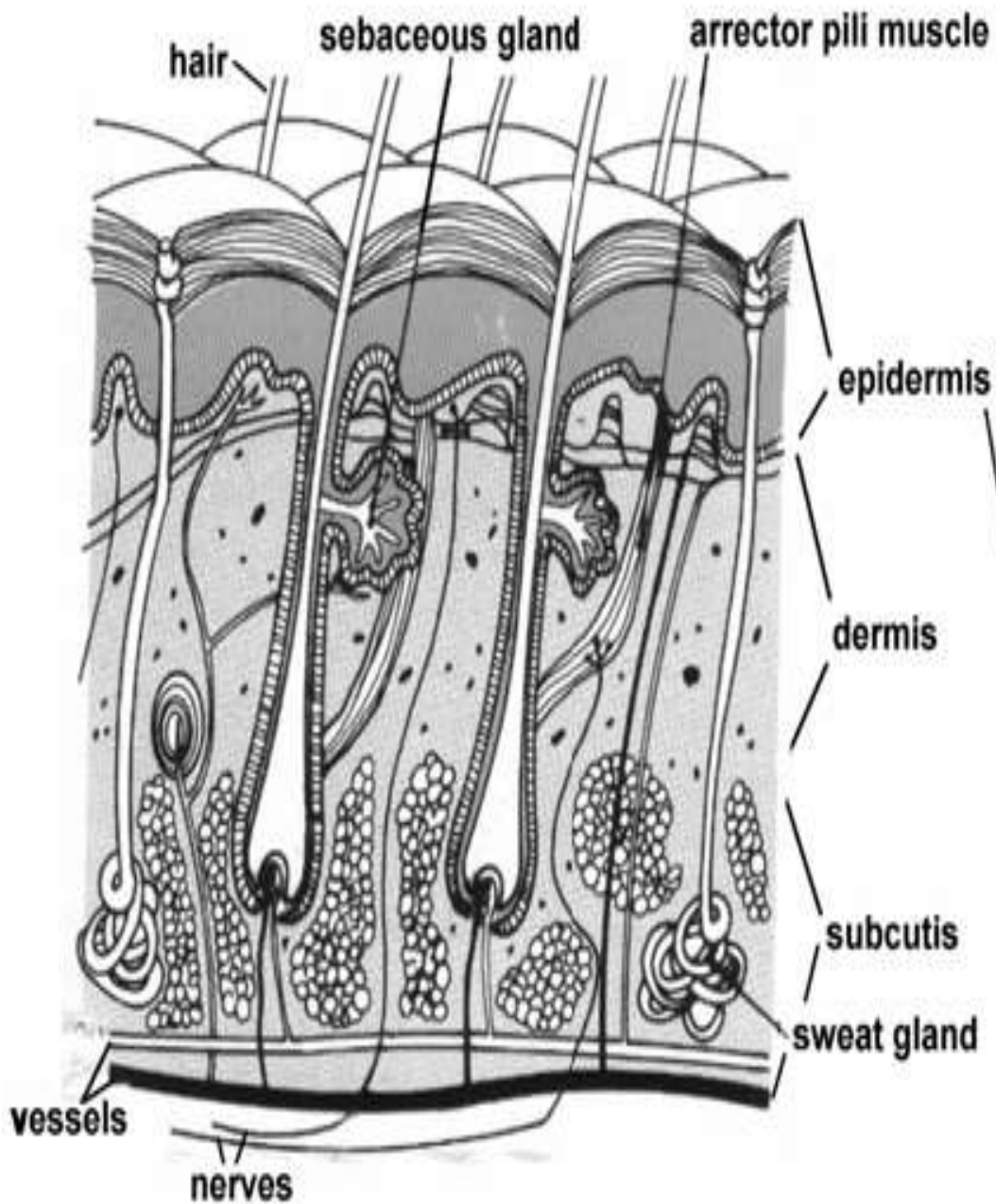
- The ***epidermis*** is made up of keratinized stratified squamous epithelium and is made of five distinct layers which are separated by the level of keratinization.
 - The ***stratum corneum*** is the outermost layer composed of dead epithelial cells filled with keratin.

The Integumentary System

- The ***stratum lucidum*** is the layer that separates the s. corneum from the next layer and it is only found in the thick skin in the soles of the feet and palms of the hand.
- The ***stratum granulosum*** is composed of 3-5 layer of flattened granular cells filled with keratin.
- The ***stratum spinosum*** is composed of many layers of rounded cells with large nuclei.

The Integumentary System

- The ***stratum basale*** is the inner most layer which is directly above the basement membrane and is composed of a single row of cuboidal epithelial tissue containing melanocytes.



The Integumentary System

- The **epidermis** is responsible for protecting the body with keratin, it is waterproof both keeping water in and out, it is easily repaired from injury and it keeps microorganisms and chemicals out.
- The pigment **melanin** is produced in the epidermis and is responsible for skin color, which is produced by **melanocytes** in the stratum basale.



The Integumentary System

- The number of melanocytes is the same regardless of race but the production of melanin is controlled by a person's DNA, factors that affect melanin production along with DNA are UV rays, chemicals and drugs such as antihistamines and antibiotics.

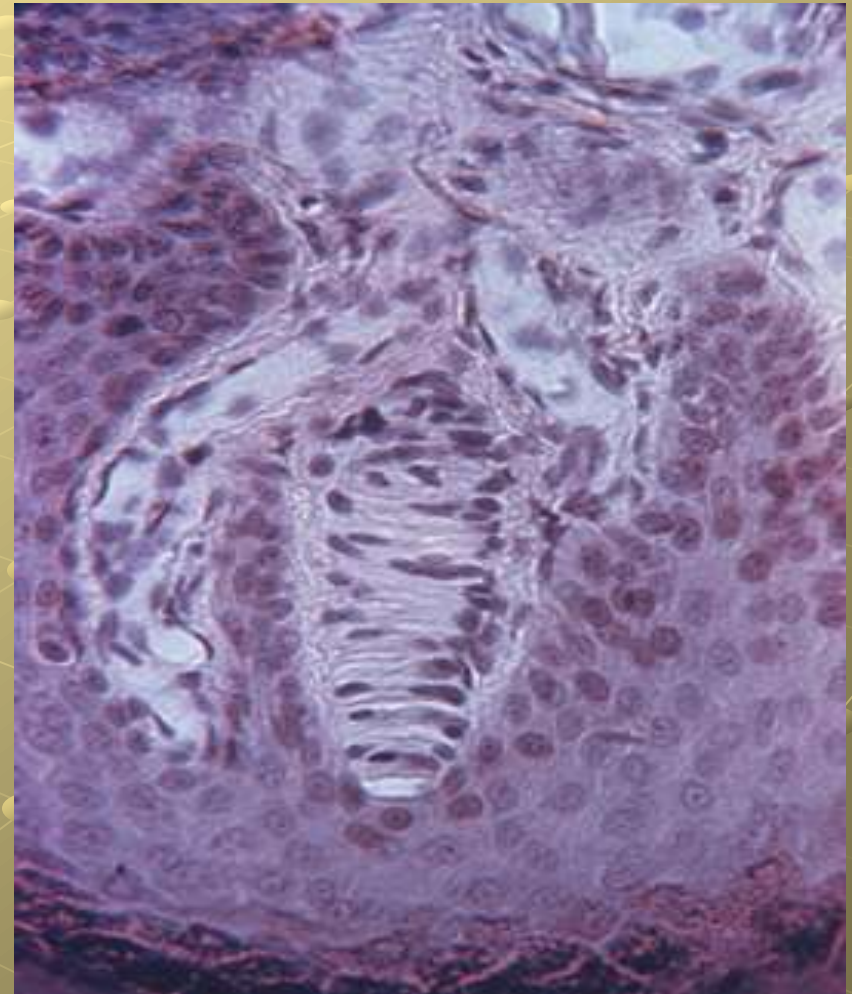


The Integumentary System

- The ***dermis*** is the inner layer of skin which binds the epidermis to underlying tissues and it is composed of two distinct layers.

The Integumentary System

- The ***papillary layer*** makes up 20% and is composed of loose areolar CT.
 - The surface forms dermal papillae (finger like projections into the epidermis) which house many Meissner's Corpuscles.

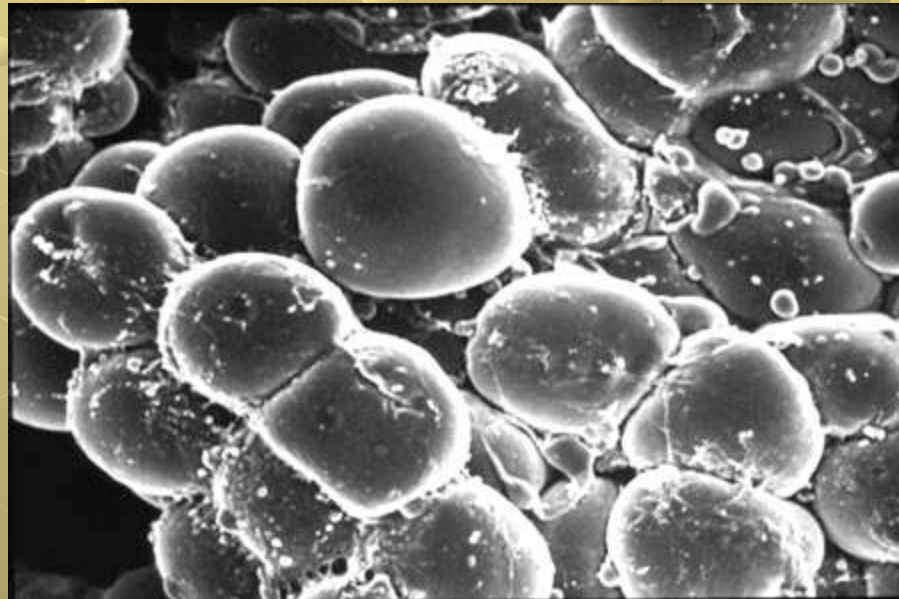


The Integumentary System

- The ***reticular layer*** makes up 80% and is composed of dense irregular CT.
- The dense irregular CT is made up of bundles of collagen, elastic and reticular fibers which give skin its strength and resiliency.

The Integumentary System

- The ***subcutaneous layer*** is made up of adipose tissue and blood vessels which provide insulation for the body to keep a constant 98.6 °F



The Integumentary System

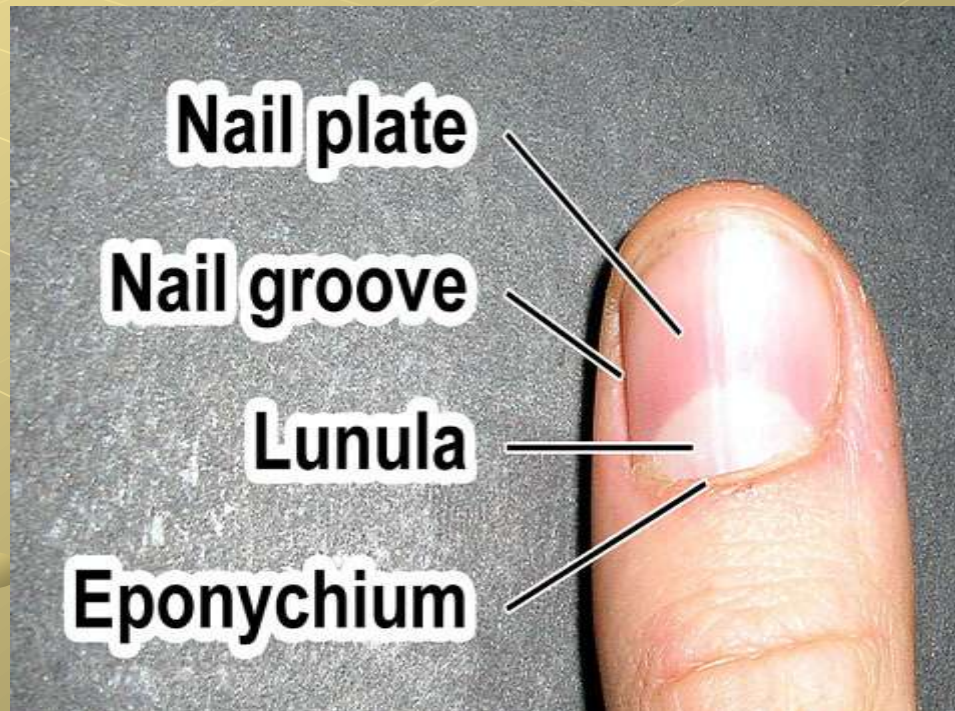
- The following are ***accessory organs*** which can be considered extensions of the epidermis.
 - ***Hair follicles***, which are made up of a root, base and follicle in the dermis and a shaft or hair in the epidermis.

The Integumentary System

- The cells are epithelial and mature as they get closer to the surface meaning the root is young and growing and the hair is exposed and full of keratin.
- Their major pigment is melanin.
- It is controlled by *arrector pilli muscles* which are smooth muscles that allow your hair to stand on end (“goose bumps”)

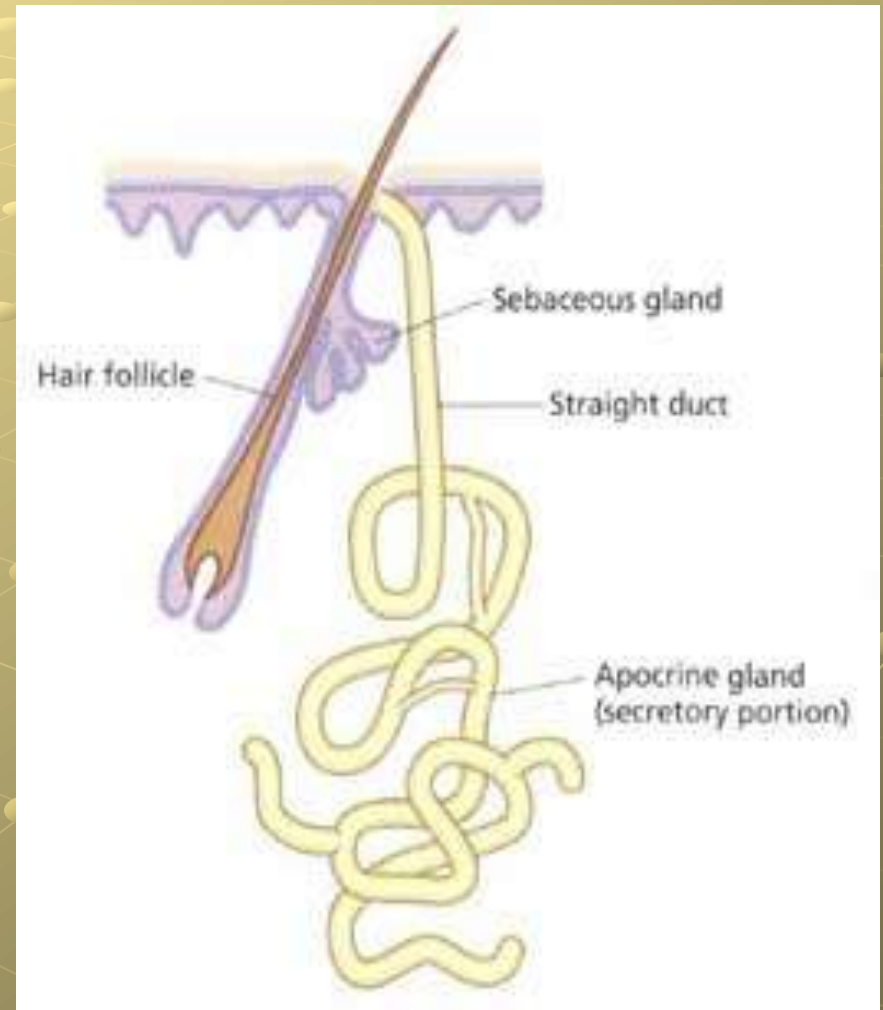
The Integumentary System

- ***Nails***, which are made up of keratinized epithelium that are used to manipulate objects and protect finger tips.



The Integumentary System

- **Sweat glands (sudoriferous glands)**, which are divided into two types based on what they secrete.



The Integumentary System

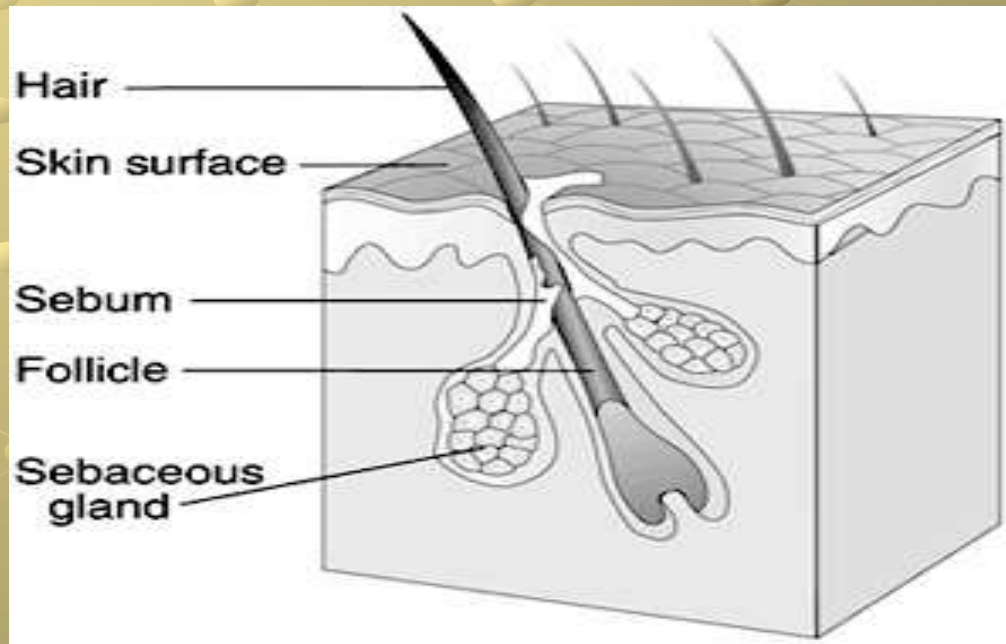
- ***Merocrine glands***, which are found with the duct deep in the dermis and the pore on the surface.
 - These glands respond to elevated temperatures by secreting odorless water, salts, urea and uric acids (waste products).
 - These types of glands are found on the head, neck and back.

The Integumentary System

- **Apocrine glands**, which are found in the dermis and the ducts terminate into hair follicles.
 - These glands respond to stress and emotions by secreting a solution of sweat like the one above plus oil and cellular debris that has a distinct smell (B. O.)
 - These types of glands are in the armpits and groin and don't begin to function until puberty.
 - There are two modified versions of these glands: 1.) **ceruminous glands** which are found in the external ear (secrete ear wax), 2.) **mammary glands** which are the breasts (secrete milk).

The Integumentary System

- ***Sebaceous glands***, which are glands that are associated with hair follicles that secrete *sebum* or oil composed of fat and cellular material.



The Integumentary System

- *Sebum* is the substance that makes the skin soft, pliable and virtually waterproof.
- **Acne** is a disorder that is a hyper secretion of sebum which causes the ducts to clog and inflame.
- **Seborrhea** which is hyper production of sebum which causes oily skin.



The Integumentary System

- The functions of the skin are numerous and far reaching. They include:
 - **Protection** from water loss, injury and chemicals and microorganisms.
 - The minimal **excretion** of urea and uric acid waste.
 - **Regulation of body temperature** by acting as an insulator.
 - **Cutaneous sensation** or the sense of touch which is controlled by Messiner's and Pacinian corpuscles.

The Integumentary System

- ***Meissner's corpuscle's*** which are responsible for light touch. They are located in the tips of fingers, palms of hands and soles of feet.
- ***Pacinian corpuscle's*** which are responsible for pressure detection. They are located in the joints, tendons, muscles, mammary glands and external genitalia

The Integumentary System

- ***Vitamin D synthesis*** which is activated by UV radiation from the sun.
- ***Blood reservoir***, the dermis houses 10% of the body's blood vessels.
- Site of some of the body's ***immunity*** such as Langerhan cells (macrophages) and immune responses such as hives.

The Integumentary System

- As you age the skin becomes less efficient in its ability to produce vitamin D, in its ability to regulate body temp. through sweating and warming through blood flow (blushing is an attempt of the body to warm the surface of the skin through blood flow).
- As the skin ages it exhibits wrinkling, sagging and liver spots due to a lack of elasticity and pigmentation ability (tanning).

